PRELIMINARIES SPECIFICATION

FOR

CITY COLLEGE PLYMOUTH
MARINE TECHNOLOGY CENTRE

Issued by:-

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Project: City College Plymouth - Marine Technology Centre

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Prepared by: Gavin Way

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A10 PROJECT PARTICULARS

110.000 THE PROJECT AND BIM REQUIREMENTS:

- The project is the fit-out from shell and core of newly constructed industrial workshop units to a practical teaching and seminar space including office and welfare space for City College Plymouth. The fit-out will include the introduction of a mezzanine deck to create a new first floor area with practical teaching spaces located at ground floor and offices, seminar spaces and welfare facilities located at first floor.
- The project shall involve the extension of incoming services and new MEPH installation to support the project and end user requirements.
- Particulars of the project as a whole are given in Main Contract Preliminaries.
- The Contract shall ensure that the requirements of the specifications and drawings are met.

120.000 THE EMPLOYER:

- The Employer:

  City College, Plymouth

130.000 CONTRACT ADMINISTRATOR:

- The term Contract Administrator (CA) is used throughout this specification and his duties will be carried out by
  - Greg Parry Consulting Ltd
    - Greg Parry
    - greg@gparryconsulting.co.uk

140.000 DESIGN AND PROJECT TEAM:

- Principal Designer:
  - Greg Parry Consulting Ltd
    - Greg Parry
    - greg@gparryconsulting.co.uk

- Architect:
  - Greg Parry Consulting Ltd
    - Greg Parry
    - greg@gparryconsulting.co.uk

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  - Silcock Dawson & Partners
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    - Gavin Way
    - gway@silcockdawson.co.uk
    - Ognyan Analiev
    - oanaliev@silcockdawson.co.uk

160.000 STATUTORY UNDERTAKINGS:

- Building Control

  Refer to the Main Contract Preliminaries

170.000 SUBCONTRACTOR:

- The term Subcontractor is used throughout this specification and is deemed to be synonymous with the term Subtrader and the like which may be used elsewhere within the Contract Documentation.
- The term ‘Subcontractor’ shall be deemed to mean ‘Contractor’.

180.000 THE SUBCONTRACT:

This document has been prepared using the Common Arrangement of Sections and this

Subcontract comprises the following

- Mechanical Services Installations
- Electrical Services Installations
- Public Health Service Installations
- Automatic Controls Installations
- Above Ground Sanitary Drainage Installations

The Engineering Services Installations covered by this Subcontract comprise

- Mechanical Services Installations
- Public Health Service Installations
- Electrical Services Installations
- Automatic Controls Installations
- Building Management System Installations

A11 TENDER AND CONTRACT DOCUMENTS

110.000 THE TENDER DRAWINGS:

- The tender drawings are as included within the tender package. Refer to Mechanical and Electrical Particular Specification Appendices.

120.000 THE SUBCONTRACT DRAWINGS:

- The subcontract drawings are the same as the tender drawings.

140.000 PRE-CONSTRUCTION INFORMATION (CDM):

- Details of the Pre-construction information are included in the Main Contract Preliminaries.

150.000 INSPECTION:

- Drawings and other documents relating to the Contract generally may be inspected, by appointment, prior to the submission of tender.
- No allowance can or will be made post tender for any omission of works or cost arising from information available at the time of Tender.

A12 THE SITE EXISTING BUILDINGS

110.000 THE SITE / EXISTING BUILDINGS:

- The existing building is formed of newly constructed workshop units totally 631m^2 incorporating roller shutters and access doors from the car park area. The building constructed of a clad steel frame structure with block work at low level.
- Services will be provided as part of the shell and core installation with incoming service locations and sizes/capacities detailed on the drawings and in the specifications.
  - Refer to the Main Contract Preliminaries for further site information.

120.000 SITE LOCATION:

- The site is located at:
  - Ocenasgate Phase 2 Development Building 1.6
  - Devonport
  - Plymouth
  - Devon
  - PL1 4RW

130.000 EXISTING MAINS / SERVICES:

- As part of the shell and core (base build services) the following services will be installed for extension to serve the new installation by the Contractor.
  - Drainage
  - Incoming mains cold water
  - Incoming gas supply
  - Incoming electrical supply
- Refer to drawings and specifications for further details

140.000 RISKS TO HEALTH AND SAFETY:

- The nature and condition of the site/building(s) cannot be fully and certainly ascertained before opening up.
- The following risks are or may be present.
- The accuracy and sufficiency of this information is not guaranteed by the Employer or the CA and the Subcontractor must ascertain for himself any information he may require to ensure the safety of all persons and the Works.
- Comply with the requirements of the CDM Regulations by:
  - Compiling risk assessments for the Subcontract works.
  - Providing information on the Subcontract works which might affect the health or safety of any person.
  - Providing appropriate input to the Pre-Construction Information, Construction Phase Plan, and Health and Safety Files for the works.

150.000 SURVEY:

- Ascertain the nature of the site and all local conditions and restrictions likely to affect the execution of the Works.
- Before commencing work, carry out a survey and examination of buildings, structure and engineering services affected by the works.
- Examine all available drawings of the engineering services and report any discrepancies to the CA.

170.000 SITE VISIT:

- Before tendering, ascertain the nature of the site, access there to and all local conditions and restrictions likely to affect the execution of the Subcontract Works. Site visit may be made by the Subcontractor through the Main Contractor
- Claims due to lack of knowledge of site conditions due to not visiting site shall not be entertained.

A13 DESCRIPTION OF THE WORKS AND COMMON DESIGN CRITERIA

110.0 THE MAIN CONTRACT WORK:
- The main contract work is described in the Main Contract Preliminaries.

120.000 THE BUILDING:
- Refer to Architectural drawings for full details.

130.000 PREPARATORY WORK BY OTHERS:
- Enabling works comprising
  - Installation of incoming services

140.000 THE SUBCONTRACT WORK:
- Supply, install, balance, test and commission the building services installations and undertake activities defined in this specification and as following (but not limited to):-
  - Mechanical and Electrical Installations including Statutory Undertakings.
  - Electrical supplies to all Mechanical Items of Plant and Equipment.
  - Automatic Control Systems/BMS.
  - Public Health.
  - Builders work in connection with all of the above.
  - Co ordination of the M&E services including power for mechanical services.
  - Completion of the thermal model and issue of EPC and BRUKL documentation.
  - Production of O&M manuals, record drawings and building log book.
- Undertake the detailed design of CDP items by appointment of a specialist and supply, install, balance, test and commission the building services installations and undertake activities defined in this specification and as following (but not limited to):-
  - Compressed Air Systems
  - Automatic Control Systems/BMS.

150.000 WORK BY OTHERS AND CO-ORDINATION OF TRADES:
- Allow for co-ordinating the subcontract works with the works of other trades and installations which may be on-site during the period of the subcontract.

160.000 COMPLETION WORK BY OTHERS:
- Builder's work.

210.000 COMMON DESIGN CRITERIA:
- Refer to the Mechanical and Electrical Particular Specifications

240.000 ELECTRICAL SUPPLY:
- Where systems are specified as being maintained 'under fire conditions' ensure wiring selected is suitable for the temperatures to be encountered.

250.000 PLANT OPERATING CONDITIONS:
- Ensure all plant items are suitable for operation in the environment in which they are to be located.
- Ensure all plant, motors, starters and ancillary equipment etc. are suitable for operation at full capacity under the following conditions
  - Height above sea level not exceeding 1000m.
  - Air cooling at an average temperature over 24 hours not exceeding 35°C dry bulb.
  - Maximum conditions of 40°C dry bulb and 50 per cent relative humidity.
    - Supply voltage approximately sinusoidal following conditions (m)

260.000 ROOM TERMINAL LOCATIONS:
- The positions of all connection points, accessories, apparatus, equipment and other room terminals shown on the tender drawings are approximate and for guidance in the preparation of the tender.
- Agree, with CA, which terminals are subject to final positioning on-site.

- Allow for the movement of all such terminals up to a radius of 2.0m from the positions shown on the drawings.
- Mounting heights indicated in tender documents are for tender purposes only. Confirm mounting heights with the CA before commencing work on-site.

270.000 ELECTROMAGNETIC COMPATIBILITY AND ELECTROMAGNETIC FIELDS:

- Ensure all equipment and installations meet the requirements of relevant legislation:
  - The Electromagnetic Compatibility Regulations 2016.
  - The Radio and Telecommunications Terminal Equipment Regulations 2000 as amended.
  - The Medical Devices Regulations 2002 as amended.
- The Supply of Machinery (Safety) Regulations 2008 as amended. Requirements of, BS EN 62305 and BS 7671 (IET Wiring Regulations) for surge protection and lightning protection.
- Ensure electrical power installations comply with the electromagnetic compatibility requirements of BS 7671 (IET Wiring Regulations).
- Ensure that earthing arrangements and earthing systems comply with BS EN 50310 and BS IEC 61000-5-2.
- Ensure that telecommunications installations comply with BS 6701.
- Ensure that data and control systems cabling infrastructure complies with BS EN 50174-series.
- Ensure that records of installation practices used to achieve compliance with relevant legislation and standards, are maintained throughout design, installation and commissioning, and are provided in operation and maintenance information.
- Validate electromagnetic compatibility of the completed works:
  - Provide evidence of good EMC installation practices.
  - Provide evidence of product conformity to relevant legislation and standards for electromagnetic compatibility, and suitability of the equipment for the zone(s) in which it is to be installed and used.
  - Undertake measurements of electromagnetic emissions on completion, to demonstrate that emission levels are within the limits set by the relevant emissions standard for the electromagnetic environment within each zone.
- Comply with the Control of Electromagnetic Fields at Work Regulations 2016 during the construction and commissioning of the works.
- Ensure the completed works comply as necessary with the Control of Electromagnetic Fields at Work Regulations 2016.
- Ensure that areas intended for general occupation and use, do not exceed the indirect-effect action levels and exposure limit values mandated in the Control of Electromagnetic Fields at Work Regulations 2016.
- Ensure that the following are clearly identified in the Operation and Maintenance Manual and where appropriate the Health and Safety File:
  - All areas where the indirect-effect action levels and exposure limit values may be exceeded, and any relevant precautions, safe methods of work and personal protective equipment, that apply to those areas.
  - All operations and maintenance activities that may exceed the exposure limit values and/or indirect-effect action levels, along with recommended safe methods of work and personal protective equipment required.
  - All areas where electromagnetic fields exist that may affect employees at particular risk, including users of active and passive implanted medical devices, body worn medical devices or as a result of pregnancy.

280.000 PERFORMANCE CHARACTERISTIC DETAILS:

- Details of the equipment as selected for inclusion into the Works and shall include, in a format to be agreed, the following information
  - Plant item description, reference identification and serial number.
  - Electrical input rating - kVA, Volts, Phase.
  - Operating mode - duty, standby, generator etc.
  - Starting characteristics - starter type, current, starts/hour and starting time.
  - Performance characteristics - (full load current and power factor).
  - Noise level.

- Weight.

290.000 SOFTWARE:
- Obtain on behalf of the end user all appropriate licences, permissions, copyright waivers, rights of use and the like from the owners of the software rights.
- Ensure that the end user is properly registered with the software supplier for support and appropriate updating.
- Provide documentation for application software in accordance with BS ISO/IEC 26513 and BS ISO/IEC 26514.
- Ensure that, as far as practical, all software is commercially available off-the-shelf.
- Ensure that any programmable configuration, customisation and bespoke software, is developed, tested and commissioned using relevant processes and procedures complying with BS ISO/IEC/IEEE 12207 or BS ISO/IEC/IEEE 15288, supported by quality management system meeting the requirements of BS EN ISO 9001.

BS APPENDIX

BS 6701:2016+A1:2017
Telecommunications equipment and telecommunications cabling. Specification for installation, operation and maintenance

BS 7671:2018
Requirements for electrical installations. IET Wiring Regulations

A20 THE CONTRACT / SUB-CONTRACT

110.000 MAIN CONTRACT PARTICULARS:

- The Main Contract particulars are given in the Main Contract Preliminaries, Section to be reviewed by Sub-Contractor.

120.0 THE SUBCONTRACT CONDITIONS:

- The Subcontract conditions are given in the Main Contract Preliminaries, to be reviewed by the Sub-Contractor

130.000 SUBCONTRACT GUARANTEE BOND:

- Ensure compatibility with the Main Contract guarantee bond.

140.000 WARRANTIES:

- Enter into the following Warranties as described in the Sub-Contract

A30 TENDERING / SUB-LETTING / SUPPLY

100.000 SUBCONTRACT TENDERING:
110.000 SCOPE:
- These conditions are supplementary to those stated in the invitation to tender and on the Form of Tender and Agreement.

120.000 TENDERING PROCEDURE:
- Tendering procedure is in accordance with the principles of
- 'Code of Procedure for Single Stage Selective Tendering' 1996.

130.000 EXCLUSIONS:
- If the Subcontractor cannot tender for any part(s) of the work as defined in the tender documents, he must inform the CA as soon as possible, defining the relevant part(s) and stating the reasons for his inability to tender.

140.000 ACCEPTANCE OF TENDER:
- The Employer and his representatives:
  - Offer no guarantee that the lowest, or any tender, will be recommended for acceptance or accepted.
  - Will not be responsible for any cost incurred in the preparation of any tender.

150.000 PERIOD FOR ISSUE OF NOMINATION INSTRUCTIONS:
- Where a minimum period has been stipulated by the CA in the Invitation to Tender, it must not be altered by the Subcontractor without the approval of the CA.

200.000 PRICING/SUBMISSION OF DOCUMENTS

230.000 PRICING OF PERFORMANCE SPECIFIED WORK:
- Ensure tenders include for all work necessary to meet the requirements for the Performance Specified Work and its completion and proper integration with the Works generally.

290.000 PRICING OF SUBCONTRACT SPECIFICATION AND DRAWINGS:
- Alterations and qualifications to the specification and drawings must not be made without the written consent of the CA. Tenders containing such alterations or qualifications may be rejected. Costs relating to items in the specification which are not priced will be deemed to have been included elsewhere in the tender.

295.000 TENDER PRICING DOCUMENTS:
- Provide an analysis of engineering services tender sum with the returned tender
  - Indicate against each item the cost and totalling the sums carried forward to the form of tender.
  - The analysis is to include
    - Preliminaries / General conditions including costs associated with the site, access, scope and extent of the works, special conditions affecting the manner of working and restrictions or obligations imposed by the Employer which will affect the cost of the Contract Works.
    - The Mechanical, Electrical and Public Health works priced by work section.
    - Provisional Sums.
    - PC sums.

331.000 A SCHEDULE OF RATES:
- A schedule of rates based on the rates used to build up the tender must be submitted:
  - within one week of request.
- The Schedule must include rates for all significant items of work.
- Rates to include Contractor's cash discount.
- These rates will be used to value all variations.

360.000 PROGRAMME:

- The Subcontractor's proposed programme as specified in Management of the Works (Part A/A32) or a summary thereof showing the sequence and timing of the principal parts of the Works, periods for planning and design, and itemising any work which is excluded must be submitted with the tender

362.000 ORGANISATION LINE DIAGRAM:

- Submit with the tender an organisation line management diagram produced specifically for the project.
- The management diagram to include all key personnel identified in clause 364.000

364.000 SCHEDULE OF KEY PERSONNEL:

- Submit with the tender a schedule of key personnel who will manage, engineer and deliver the project from pre-construction to the end of the defects period.
- The same personnel should be involved at all stages of the project. Where this is not possible this shall be indicated in the schedule with reasons why.
- As a minimum the schedule should include the following:
  - Project Director
  - Project Manager
  - Site manager

366.000 OPERATING PROCEDURE STATEMENTS:

- Submit with the tender a set of company standard operating procedure statements.

370.000 TENDER STAGE METHOD STATEMENTS:

- Method statements must be submitted with the Tender describing health and safety considerations and how and when the subcontractor proposes and undertakes to carry out the following.
  - Resourcing for design duties.
  - Testing and commissioning. following.
- Method statements must be submitted before the execution of the Subcontract describing health and safety considerations and how and when the subcontractor proposes and undertakes to carry out the following.
  - Resourcing for design duties.
  - Testing and commissioning.

380.000 ALTERNATIVE TENDERS:

- In addition to and at the same time as his tender for the Subcontract Works as defined in the tender documents, the Subcontractor may, at his discretion, submit alternative design proposals and/or method(s) of construction/installation for consideration. Alternatives which would involve significant changes to other work will not be considered.
- Such alternative(s) must include all additional costs arising from necessary changes to the details of the installation, including changes to the design and drawings, as well as any associated ancillary equipment items.
- Such alternative(s) is/are deemed to be alternative tender(s) and each must include a complete and precise statement of the effects on cost and programme.
- Full technical data for each such alternative must be submitted with the Tender together with details of any consequential amendments to the design and/or construction/ installation of other parts of the Works.
- Full technical data for each such alternative must be submitted within one week of request together with details of any consequential amendments to the design and/or construction/ installation of other parts of the Works.

390.000 ALTERNATIVE MANUFACTURERS/SUPPLIERS:

- In addition to and at the same time as the tender for the Subcontract Works as defined in the tender documents, the Subcontractor may, at his discretion, submit alternative manufacturers or suppliers for consideration. Alternatives which would involve significant changes to other work will not be considered.

- Such alternative(s) must include all additional costs arising from necessary changes to the details of the installation, including changes to the design and drawings, as well as any associated ancillary equipment items.
- Such alternative(s) is/are deemed to be alternative tender(s) and each must include a complete and precise statement of the effects on cost and programme.
- Full technical data for each such alternative must be submitted with the Tender together with details of any consequential amendments to the design and/or construction/installation of other parts of the Works.
- Full technical data for each such alternative must be submitted within one week of request together with details of any consequential amendments to the design and/or construction/installation of other parts of the Works.
- Full technical data for each such alternative must be submitted before the execution of the Subcontract together with details of any consequential amendments to the design and/or construction/installation of other parts of the Works.

400.000 SELECTION OF MANUFACTURERS/SUPPLIERS:
- Where manufacturers, suppliers or installers of products are NOT identified by name select products that comply in all respects with the specification and, as and when requested, demonstrate such compliance. These suppliers shall operate a quality management system which complies with the requirements of BS EN ISO 9001.
- Where manufacturers, suppliers or installers of products are identified by name, or names, but no reference is made to "Or approved" equivalent use these exclusively.

Where manufacturers, suppliers or installers of products are identified by name, or names, but reference is made to "Or approved" equivalent alternatives may be selected and shall be submitted to the CA for approval. These suppliers shall operate a quality management system which complies with the requirements of BS EN 9001.
- Where manufacturers, suppliers or installers of products are identified by name, or names, but reference is made to "Or approved" equivalent the submitted tender must include the named or one of the named suppliers. Alternatives may be selected and shall be submitted to the CA for approval, separately.
- Check that any proposed alternatives comply with any stated British (or other equivalent recognised International Standards. Confirm equivalence in quality, operation and space requirements to those items which have been specified by name. If, and when requested demonstrate the proposed alternative is fully equivalent to the specified item and identify any constructional, cost, programme, maintenance or other differences.

410.000 PROPOSED MANUFACTURERS, SUPPLIERS AND SPECIALISTS:
- Submit with the tender a list of all manufacturers, suppliers and specialist installers/contractors upon which the tender is based.
- The list shall include, as a minimum, all main plant items, terminal heating, cooling and ventilation devices, luminaires together with specialists for BMS/ controls, fire alarms, water treatment, systems flushing and cleaning, communications / data, security commissioning and testing and lifts.

420.000 TECHNICAL INFORMATION TO SUPPORT THE TENDER:
- Technical information relating to the tender must be submitted
- within one week of request.

430.000 QUALITY CONTROL METHOD STATEMENT AND RESOURCES:
- A statement must be submitted describing the organisation and resources which the Subcontractor proposes and undertakes to provide to control the quality of the Subcontract Works. The statement must include details of the quality management system being used and copies of relevant certification and the number and type of staff responsible for quality control, with details of their qualifications and duties.
- With the Tender.

440.000 HEALTH AND SAFETY INFORMATION:
- The Pre-construction information (PCI) compiled by the client and principal designer in accordance with the Construction (Design and Management) Regulations 2015 has been

provided to the principal contractor (Interserve)

- Submit a statement with the tender describing the organisation and resources which the Subcontractor proposes and undertakes to provide to safeguard the health and safety of operatives, and of any person who may be affected by the Subcontract works, including:
  - A copy of the subcontractors health and safety policy document, including risk assessment procedures.
  - Accident and illness records for the past five years.
  - Records of previous Health and Safety Executive enforcement action.
  - Records of training and training policy.
  - The number and type of staff responsible for health and safety on this project with details of their qualifications and duties.

450.000 RISKS TO HEALTH AND SAFETY:

- Submit a statement with the tender describing any significant and unavoidable risks which may arise as a result of carrying out the subcontract works and the measures proposed to safeguard the health and safety of operatives and of any person who may be affected by the Subcontract/works.

470.000 PROPOSALS FOR ANNUAL MAINTENANCE CONTRACT:

- Proposal
  - Submit with the Tender a supplementary proposal for an annual maintenance contract for the following
    - Mechanical Installation
    - Public Health Installation
    - Electrical Installation
    - Automatic Controls Installation
- Lift Installation in efficient working order including routine checks, adjustments, lubrication and replacement of consumable spares, etc.
- It should set out the terms of the offer, the work to be carried out, the guarantees of performance and the price of the first 12 months after Practical Completion of the Works or Section thereof.
- The proposal will not necessarily be considered as part of the tender for the Subcontract Works and the Employer does not undertake to accept it.

480.000 BMS MAINTENANCE:

- Perform BMS maintenance in accordance with the relevant sections of:

BSRIA BMS Maintenance Guide, BG 4/2003.

- Ensure that the maintenance provided covers:
  - Software upgrades.
  - Data backup and archiving.
  - Documentation upkeep.
  - Emergency call out.
  - Check operation of field controllers and communication networks.
  - Check control, alarm and data logging functions.
  - Checking of sensors for satisfactory accuracy.
  - Proper operation of actuators.
  - Assessment of plant control actions and rectification of poor performance.
  - Check correct operation of occupant controllers.
  - That necessary upgrades/changes to maintain the required functionality of any gateways are carried out.
- Provide a quotation for a one year and five year maintenance contract. Ensure that the quotation is based on identified maintenance activities and details any activities not covered by the contract.

500.000 SUB-SUBLETTING

520.000 SUB-SUBCONTRACTORS:

- Where the Subcontractor proposes to sublet any portion(s) of the Subcontract Works a list

must be submitted

- with the Tender
- The list will define such portion(s) and give, for each, the name and address of the proposed Sub-subcontractor.

A31 PROVISION, CONTENT AND USE OF DOCUMENTS

100.000 DEFINITIONS AND INTERPRETATIONS

110.000 MAIN CONTRACT PRELIMINARIES:
Definitions and interpretations given in Main Contract Preliminaries apply to the whole of the Works, including this Subcontract. In the case of conflicting statements the Subcontract Preliminaries will prevail.

120.000 DEFINITIONS:
- The definitions of technical terms associated with the engineering services installations are those included in
  - CIBSE, CIPHE and BSRIA Technical Publications
  - Loss Prevention Council - Rules for Automatic Sprinkler Installations
  - BS 7671 - Requirements for Electrical Installations (IET Wiring Regulations).
  - British Standards, including Codes of Practice.
  - Associated Statutory Acts.
- Where used in the documentation the following definitions apply
  - Duct: An enclosed space specifically intended for the distribution of services, with direct access for personnel.
  - Trench: A covered horizontal service space in the floor or ground with access from above.
  - Cavity: A space enclosed within the elements of a building within which services are installed, e.g. the space between ceiling and floor above. See Building Regulations.
  - Service Areas: Includes areas within a building with limited finishes such as loading bays, car parks etc.
  - Concealed Services: Includes installations within ducts, trenches or cavities.
  - Exposed Services: Includes installations within plant rooms, outdoors or unprotected within service or occupied areas.
  - System: System means all equipment, accessories, controls, supports and ancillary items, including supply, installation, connection, testing, commissioning and setting to work necessary for that section of the Works to function.
  - Services: Services means the inclusion of one or more systems.

130.000 REFERENCES TO BSI DOCUMENTS:
- References to BSI documents are to the versions and amendments listed in the British Standards Catalogue and any subsequent versions and amendments specifically referred to in the project documents.

140.000 MANUFACTURERS REFERENCES:
- References mean the particular product as specified in the manufacturer's technical literature current at that time.

150.000 TENDER DRAWINGS:
- Tender drawings means drawings listed in
  - the appendices within the Mechanical and Electrical Specifications
- The tender drawings show the general arrangement of the engineering services to be provided and the inter-relationship of the works with work to be installed by others.

160.000 DRAWINGS DEFINITIONS GENERALLY:
- The following clauses define concept sketch drawings, concept schematics, developed design drawings, developed schematics, technical design drawings, builder's work information, co-ordination/co-ordinated working drawings, installation drawings, builder's work details, manufacturer's drawings and record drawings. The definitions are from the latest edition of BSRIA BG 6 with the exception of Controls Logic Diagrams and Switchgear and Starter and Control Instrumentation Panel Drawings.

161.000 CONCEPT SKETCH DRAWINGS:
- Line diagrams and layouts indicating basic proposals, connections to incoming services and

utilities, locations of areas of central plant, location and extent of main vertical and horizontal distribution routes in such detail as to illustrate the incorporation of the engineering services within the project as a whole and with respect to any zoning.

161.005 CONCEPT SCHEMATICS:

- Line diagrams indicating main items of plant and their interrelationships, including with incoming services and utilities in such detail as to illustrate the incorporation of the engineering services within the project as a whole.

162.000 DEVELOPED DESIGN DRAWING:

- A drawing showing the extent of the services installations. The main features of developed design drawings should be as follows:
  - Plan layouts to a scale of at least 1:100 with key areas at 1:50.
  - Show the extent and types of services terminals visible within the occupied space. Alternatively these can be quantified and scheduled either as a tag on the drawing or as a separate schedule of room data sheet.
  - Show approximate locations of horizontal and vertical service runs.
  - Show main plant and distribution system sizes, particularly those affecting spatial allocation, while acknowledging that these may need some adjustment and refinement in the operation of the technical design drawings and equipment schedules.
  - Pipework and electrical containment represented by single line layouts. Ductwork represented by either double line or single line layouts as required to demonstrate that the routes indicated are feasible (this should be supplemented with key sections / elevations). Symbols and lines conventions in accordance with either a recognised standard (ISO of BS), or a supplied legend.
  - Show how space within risers and service zones is allocated to M, E and PH services.
  - Where appropriate these drawings should indicate typical room / area details to show key principles of the systems within or serving them.

162.005 DEVELOPED DESIGN SCHEMATICS:

- Line diagrams describing the interconnection of components in a system showing the engineering principles. The main features of a developed schematic drawing are as follows:
  - The drawings should include all the functional components that make the system work, such as main plant distribution, inline equipment supporting engineering performance, terminal plant providing HVAC performance. Quantities of performance-specified components should only be indicative with accurate quantities on schedules or similar.
  - Symbols and line conventions in accordance with a recognised ISO or BS standard or supplied legend.
- Indicate components which have a sensing, control or measurement function.
- The major components indicated on the schematic drawings should be identified for cross-referencing purposes.
- Where appropriate these drawings should indicate typical room / area details to show key principles of the systems within or serving them.

163.000 TECHNICAL DESIGN DRAWING:

- A drawing showing the intended locations of plant items and service routes in such detail as to indicate the design. The main features of technical (detail) design drawings should be as follows:
  - Plan layouts to a scale of at least 1:100.
  - Plant areas to a scale of at least 1:50 and accompanied by cross-sections and elevations as appropriate.
- The drawing will not indicate the precise position of services, but it should nevertheless be feasible to install the services within the general routes indicated. It should be possible to produce co-ordinated working drawings or installation drawings without major rerouting of the services. The design must also consider procurement and installation methodologies.

163.002 TECHNICAL DESIGN SCHEMATICS:

- Line diagrams describing the interconnection of components in a system showing the engineering principles. The main features of a Technical Design schematic drawing are as

follows:

- The drawings should include all the functional components that are to be installed. This includes main plant distribution, inline equipment, terminal plant and components, control components.
- Symbols and inline conventions in accordance with a recognised ISO or BS standard or a supplied legend.
- The drawings should be labelled with appropriate pipe, duct, busbar, cable sizes and fault levels, pressure and flow rates. These details may be subject to adjustment during the construction stage.
- The major components indicated on the schematic drawings should be identified for cross-referencing purposes.
- Where necessary, control methodologies such as load shedding and capacity.

163.005 BUILDERS WORK INFORMATION:

- A drawing to show the provisions required to accommodate the services which significantly affect the design of the building structure, fabric and external works.
- Drawings (or schedules) of work to be carried out by building trade and required to be costed at the design state e.g. plant bases.

164.000 CO-ORDINATED WORKING DRAWINGS:

- Drawings showing the inter-relationship of 2 or more engineering services and their relation to the structure and building fabric. The main features of a co-ordinated drawing are as follows:
  - Plan layouts to a scale of at least 1:50, accompanied by cross-sections to a scale of at least 1:20 for all congested areas.
  - The drawing should make allowances for installation, commissioning, maintenance and replacement working space and methodologies.
  - The drawing should be spatially co-ordinated and there should be no physical clashes between the system components when installed. Critical dimensions, datum levels and invert levels should be provided.
  - The spaces between pipe and duct runs shown on the drawing should make allowance for the service at its widest point. Allow for insulation, standard fitting dimensions and joint widths on the drawing.
  - Indicate positions of main fixing points and supports where they have significance to the structural design or spatial constraints.

165.000 INSTALLATION DRAWING:

- A drawing based on the Technical Design drawing or co-ordinated working drawing with the primary purpose of defining that information needed by the tradesmen on-site to install the works. The main features of installation drawings should be as per co-ordinated working drawings plus:
  - Allowances for inclusion of all supports and fixings necessary to install the works.
  - Allowances for installation details provided from manufacturers' drawings.
  - Allowances for plant and equipment. This includes any alternatives to the designer's original specified options that have been chosen.
  - Space for associated support systems, installation, methodologies and access for maintenance and replacement.
- Where co-ordinated working drawings have not been produced, the installation drawing should include co-ordination.

166.000 INSTALLATION WIRING DIAGRAM:

- Drawing showing the interconnection of electric components, panels etc in accordance with the design intent indicated in the schematic drawings and incorporating the details provided on manufacturer's certified drawings.
- Indicate the following: maximum electrical loading for each supply cable; cable termination facilities; and cable identification and all terminal numbers.

166.005 BUILDER'S WORK DETAILS:

- Drawings to show requirements for building works necessary to facilitate the installation of

the engineering services.

- Unless agreed otherwise, the following can be marked out on-site:
  - Holes less than the threshold agreed by the team
  - Electrical socket and switch boxes
  - Openings that are best cut into blockwork or partitions

168.000 MANUFACTURER'S DRAWING:

- Drawing prepared by a manufacturer, fabricator or supplier for a particular project and which is unique to that project. Examples include drawings for ductwork, prefabricated pipework, sprinkler systems, control and switchgear panels and associated internal wiring, prefabricated plant, customised plant and equipment.

170.000 RECORD DRAWING:

- Drawing showing the building and services installations as installed at the date of practical completion. The main features of the record drawings should be as follows:
  - Use a scale not less than that of the installation drawings.
  - Include locations of all the mechanical, electrical and public health systems and components installed including ducts, pipes, cables, busbars, plant items, pumps, fans, valves, dampers, control devices, strainers, terminals, electrical switchgear and components, security and fire sensors and control components.
  - Labelled with appropriate pipe, duct and cable sizes, pressures and flow rates.
  - Have marked on the drawings the positions of access points for operating and maintenance purposes.
  - The drawings should not be dimensioned unless the inclusion of a dimension is considered necessary for location.

180.000 CONTROLS LOGIC DIAGRAMS:

- Diagrams, drawings and/or schematic details of all control components and instruments showing the layout with each item uniquely identified together with a description of the controls operation and details of the associated interlocking.

181.000 SWITCHGEAR, STARTER AND CONTROL INSTRUMENTATION PANEL DRAWINGS:

- Drawings showing the construction and internal wiring diagrams of the starters, panels and/or other devices.

182.000 AS-INSTALLED DRAWINGS:

- Drawings/records retained on-site to record the progress of and any site modifications to the Works including any changes to software.

183.000 PLANTROOM SCHEDULES AND SCHEMATICS:

- Provide good quality plant and switch room drawings, schedules, schematics and instructions and hang in the respective plant room or any other appropriate location or where directed by the CA.
- Protect surfaces of such information by
  - Pressure lamination.
  - Framing under glass or other rigid, transparent, cleanable and protective surface.
- Hang using suitable fixings and provide backboards if necessary.
- A sample shall be submitted for approval to the CA prior to commencing production.
- Schematic drawings of circuit layouts showing:
  - Location, identification and duties of equipment
  - Location of controls devices
  - Circuit layout
- Frame the following under glass and hang in each plant room and any other appropriate location:
  - Schematic drawings of circuit layouts showing identification and duties of equipment, numbers and locations, controls and circuits.
  - Valve schedules in the form of printed sheets showing the number, type, location, application/service and symbol, and normal operating position of each valve

- Control schematics
- Location of mechanical and electrical plant and equipment items
- First aid instructions for treatment of persons after electric shock
- Location of isolating switch for electricity supply
- Location of isolating switch for PV installation
- Location of main incoming gas valve serving gas meter and isolation point
- Location of main incoming water main and isolation point
- Emergency operating procedures and telephone numbers for emergency call out service applicable to any system or item of plant and equipment

- All other items required under Statutory or other regulations

190.000 EXAMINATION OF DRAWINGS/INFORMATION:

- The CA will examine the propositions submitted for compliance, in principle, with the design intent. Such an examination shall not relieve the originator of such documents of his responsibilities and obligations under the contract.
- The drawings will be returned to the sub-contractor as one of the following status:

Status A - Accepted in full.
Status B - Accepted subject to relatively minor comment, re-submission not required.
Status C - Not accepted, drawing(s) to be amended as necessary and re-submitted.

- Drawings shall be submitted to the Engineer for comment in a timely manner and a minimum of five working days shall be allowed for the Engineer to respond.

- Not more than two weeks after the contract has been placed, the Sub-Contractor shall provide the Contract Administrator/Engineer with a schedule of the drawings to be produced which will also show the dates by which the drawing will be submitted and comments are required. The dates shall take due note of the periods stated above which shall be allowed for the commenting process.

- All drawings, explanations, information or other like details shall be fully co-ordinated with one another and with the contract drawings to ensure that the manufacture, construction and installation of the works may be properly completed in accordance with the Specification.
- Accepted drawings shall not be departed from except with the written approval of the Contract Administrator.

200.000 DOCUMENTS PROVIDED ON BEHALF OF THE EMPLOYER

210.000 MAIN CONTRACT PRELIMINARIES:

- Conditions given in Main Contract Preliminaries under the heading 'Documents provided on behalf of Employer' apply to documents relating to this Subcontract.

300.000 DOCUMENTS TO BE PROVIDED AND DESIGN RESPONSIBILITIES TO BE UNDERTAKEN

310.000 DESIGN AND PRODUCTION INFORMATION:

- Complete the design and detailing of the work and provide complete production information (including, as appropriate, fabrication/installation drawings, design calculations, specifications, etc.) based on the drawings, this specification and other information provided, liaising with the CA, Principal Designer, Contractor and others as necessary to help ensure co-ordination of the work with related building elements and services.
- Design responsibilities on the project shall be as detailed in schedule APPENDIX A – DESIGN RESPONSIBILITIES based on the BSRIA BG 6 proformas. The absence of a design activity does not imply it is not required on the project
  - Version
  - BG 6 Edition 5 - 2018.
- Request additional information as necessary from the CA and/or contractor and provide information as necessary in time to meet the programme.
- Submit sufficient copies of the design/production information to the contractor (or CA if the

contractor has not been appointed). The contractor (if he has been appointed) will check the information and submit his comments to the CA.

- The CA will record his comments and those of the Principal Designer and return to the contractor (or subcontractor if contractor has not been appointed).
- Make any necessary amendments without delay. Unless and until it is confirmed that resubmission is not required, resubmit for further checking and comment, and incorporate any necessary amendments all as before.
- If submitted design/production information differs from the requirements of the Subcontract documents each such difference must be the subject of a request for substitution or variation, supported by all relevant information.
- Should any amendment required by the CA be considered to involve a variation which has not already been acknowledged as a variation by the CA, notify the contractor and/or CA without delay and in any case within 7 days, and do not proceed with ordering, fabrication, or fixing until subsequently instructed. Claims for the extra cost of such work, if made after it has been carried out, may not be allowed.
- Submit sufficient copies of the final design/production information to the contractor (or CA if the contractor has not been appointed) for distribution to all affected parties.

311.000 PRODUCTION INFORMATION:

- Liaise with the CA, Contractor and others as necessary to help ensure co-ordination of the work with related building elements and services.
- Provide drawings and other information as specified showing such details of the work as the CA may reasonably require.
- Submit to the CA for comment, make any necessary amendments and resubmit for further comment unless the CA confirms that this is not necessary.
- Submit sufficient copies of final information to the CA for distribution to the Contractor and all affected parties.

313.000 CO-ORDINATION OF ENGINEERING SERVICES:

- Co-ordination of the Engineering Services Installations will be carried out
  - As part of the Sub-Contract works
- Agree principles of co-ordination with all parties concerned.
- Incorporate details provided by others into the Co-ordination Drawings.
- Provide all necessary details/drawings/schedules etc. required to enable the co-ordination drawings to be prepared by others.
- Ensure the installation drawings make due allowance for all building elements, structure and other services.
- Prior to submission check and approve all drawings, schedules and any other information provided by manufacturers, nominated suppliers or specialist sub-subcontractors to ensure that all the requirements of the contract documentation have been incorporated. Accompany all documents submitted with a certificate indicating that they have been checked by the Subcontractor.

320.000 DRAWN AND OTHER INFORMATION:

- Provide drawn information for the design team and client in the following forms:-
  - Initial copies for comment
  - PDF format
    - Final copies for distribution
  - PDF format
- Provide drawn information for the design team and client in the following numbers
- Technical design drawings
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Co-ordinated working drawings
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Installation drawings
  - Initial copies for comment (no) 2

- Final copies for design team (no) 1
- Installation wiring drawings
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Builder's work information
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Builder's work details
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Manufacturer's drawings
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Controls logic diagrams
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- Switchgear, starter and control instrumentation panel drawings
  - Initial copies for comment (no) 2
  - Final copies for design team (no) 1
- As-installed drawings
  - Site record copy
- Record drawings
  - Initial copies for comment (no) 2
  - 2 preliminary sets for use during commissioning.
  - 1 reduced set incorporated into each operating and maintenance manual.
  - 1 set in PDF format for Client's use.
- Plant room schedules and schematics
  - Initial copies for comment (no) 2
  - 2 preliminary sets for use during commissioning.
  - 1 framed set for plant rooms.
  - 1 reduced set incorporated into each operating and maintenance manual.
  - 1 set in PDF format for Client's use.
  - Provide drawings for construction in form and number as required by the contractor.

330.000 PREPARATION OF DOCUMENTS:

- Prepare drawings to commonly recognised scales generally on A1 sheets and details and schedules on A4 sheets.
- Agree scales, drawing sheet size and format with the CA before preparing any documents.
- Prepare electrical drawings in accordance with BS EN 61082-1.

350.000 DOCUMENT NUMBERING/REGISTRATION SYSTEM:

- Agree with the CA the document numbering/registration system to be used before preparing any documents.
- As a minimum, all drawings shall bear the title: -

City College Plymouth - Marine Technology Centre

- And include reference to the particular building element detailed.

- The drawing title block of each drawing shall also indicate :-
  - The name and telephone number of the producer
  - Drawing title
  - Drawing number
  - Revision
  - Scale
  - Date of drawing
  - Name of the Engineer

- Name of the Checker

360.000 BUILDER'S WORK INFORMATION:
- Confirm and amplify any information provided by the CA.
- Builder's work is excluded from the Subcontract.
- Builder's work is included in the Subcontract
- Builder's Work excludes drilling and/or plugging walls, floors, ceilings etc., for fixings for services and such work is included in the Subcontract.
- Provide Builder's Work Information, appropriate to the stage of design development, and include requirements for foundations, bases, and supporting structures for plant and equipment.
- Provide fully dimensioned drawings showing both size and position of builder's work.
- Mark out on-site, all cut holes and chases required, any pockets cast in concrete, any inserts, any built in sleeves or similar items.
- Holes may not be cut in steelwork, reinforced or precast concrete without written permission from the CA. Under no circumstances will holes be cut in pre-stressed concrete. Permitted holes in steelwork must be drilled - burning by means of welding equipment is prohibited.

370.000 TECHNICAL LITERATURE:
- The Contractor is
- advised.
- To keep copies of the following on-site, readily accessible for reference by all supervisory personnel:
- Manufacturer's current literature relating to all products to be used in the Works.

380.000 MAINTENANCE INSTRUCTIONS AND GUARANTEES:
- Retain copies delivered with components and equipment (failing which, obtain), register with manufacturer as necessary and hand over to CA on or before Practical Completion.
- Notify CA of telephone numbers for emergency services by Subcontractors after Practical Completion.

BS APPENDIX

BS 1192:2007+A2:2016
Collaborative production of architectural, engineering and construction information. Code of practice

BS 7671:2018
Requirements for electrical installations. IET Wiring Regulations

BS 8541-1:2012
Library objects for architecture, engineering and construction. Identification and classification. Code of practice

BS 8541-2:2011
Library objects for architecture, engineering and construction. Recommended 2D symbols of building elements for use in building information modelling

BS 8541-3:2012
Library objects for architecture, engineering and construction. Shape and measurement. Code of practice

BS 8541-4:2012
Library objects for architecture, engineering and construction. Attributes for specification and assessment. Code of practice

BS EN 61082-1:2015
Preparation of documents used in electrotechnology. Part 1 Rules

A32 MANAGEMENT OF THE WORKS

110.000 MAIN CONTRACT PRELIMINARIES:
- Management of the Works
- Applies to the whole of the Works, including this Subcontract. Comply with the requirements specified therein in so far as they apply to the Subcontract Works, and co-operate with and assist the Main Contractor in complying with them generally.

120.000 CO-OPERATE:
- Co-operate with the Contractor, other subcontractors, suppliers, local authorities and statutory undertakings in the execution of their work.

130.000 PROGRAMME/PROGRESS:
- Provide detailed sub-programmes to assist the Contractor in producing a Master Programme for the Contract Works.
- Due allowance is to be made in the programme(s) for the Works for, but not limited to, the following:
- Ordering and installation periods.
- The completion of drawing, etc. including the minimum working days for comment 5
- Work resulting from instructions issued in respect to the expenditure of provisional sums.
- Concurrent work by other trades.
- Any temporary works necessary for the completion of the engineering services installations.
- Pre-commissioning, commissioning and performance testing of the engineering services installations.
- Preparation and provision of Record Drawings and Operating and Maintenance Manuals.
- Provide programme information as
- GANTT chart.
  - Programme information format:
  - Portable document format (PDF)
- Provide a separate and detailed commissioning programme for agreement with the CA. Make due allowance for the following:
  - Commissioning, demonstration and instruction procedures.
  - Provision of written notice before each (or series of) test, inspection, commissioning or demonstration procedures are to be carried out, not less than 2 weeks
  - Demonstration to the CA that test instruments and equipment are accurate.

131.000 COMMISSIONING PROJECT MANAGEMENT:
- Compile a detailed commissioning programme and confirm/agree with the main contractor.
- Compile and submit to the project supervisor the appropriate health and safety method statements and risk assessments.
- Establish a means (such as checklists) of monitoring the progress of the commissioning.
- Ensure that all parties involved on the commissioning process have documentation procedures for dealing with variations to contract. Ensure that a control mechanism is set up which includes documentary back-up of what has been changed, how and why.
- Establish a consistent numbering system to identify work items.
- Ensure the consistent use of mnemonics to identify all BMS components and devices.
- Ensure regular database and configuration back-ups are made throughout all stages of the commissioning process.
- Ensure attendance of all appropriate and responsible parties for interface pre-commissioning tests (interface between BMS and other plant items/systems).

140.000 ASSESSMENT AND MONITORING:
- Record progress of the Works weekly on a copy of the programme kept on-site. Update or redraft programme without delay if any circumstances arise which affect the progress of the Works.
- Mark up "As Installed" details weekly and before any work is hidden from view.

150.000 INSPECTION AND MEASUREMENT OF WORK:

- Provide all necessary assistance to enable CA to examine or measure the Works.

151.000 BMS WITNESSING REQUIREMENTS:

- The project supervisor's nominated representative will implement the following witnessing requirements. Ensure that on-site commissioning staff facilitate the witnessing process.
- Ensure that the BMS hardware is installed in accordance with Section W60.
- Verify any operator software and associated graphics.
- Witness completely the control of any main and/or critical items of plant along with a random sample of other points.
- If less than 300 points, witness all points. Between 300 and 1,000 points witness 50% (minimum of 300 to be witnessed). If more than 1,000 points witness 20% (with a minimum of 500 points witnessed).
- Reserve the right to witness 100% of the points if the failure rate is greater than 5%.
- Witness a sample of specific functions, e.g. 10% of alarms and 10% of data logging.
- Witness one of several identical items of plant in detail with the others witnessed on a random basis.
- Verify the system security access.
- Verify that all safety-related functions perform to that specified, e.g. plant shutdown on fire condition.
- Verify all plant restarts according to that specified after building power failure and local power failure.
- Witness all power meter data-points to ensure that they match the meters.
- Ensure that trend logs are used when witnessing points in order to monitor the performance of control actions.
- Verify the handover of all operating manuals and system documentation.
- Verify the handover of backup copies of software.
- Verify the completion of any specified system operator training.

152.000 BMS - POST HANDOVER CHECKS:

- Ensure that the following post-handover checks are performed:
  - Global level checks
    - Internal air temperature.
    - Ventilation.
    - Energy consumption (ensure that the pulse-input counters match the meters).
- Check that each of the above meets the specified requirements.
- System level checks
  - Control strategies. Check that any suspect control strategies are appropriate for the intended application. Check that the suspect control strategy has been implemented and commissioned correctly. Check that the control strategy is still appropriate for the intended use.
  - Network communications. Check that all relevant field controllers communicate properly. Check for correct sharing between controllers of relevant data and correct inter-controller operation.
  - Control set-points. Check that the set-points in question are correct and appropriate for the actual operating conditions.
  - Control loop settings. Check that the control loop settings result in accurate and stable control. Check that all self-learnt characteristics are valid.
  - Control zones. Check that the control zones are appropriate.
  - Occupant controls. Check that occupant controls work correctly.
- Sub-system/component level
  - Sensors. Check the accuracy and location of any suspect sensors.
  - Actuators. Check that any suspect actuators operate correctly.
  - Dampers and valves. Check that any suspect dampers and valves are not jammed and that they operate as intended.

160.000 COVERING-UP:

- Ensure no section of the Works are covered, concealed or insulated until completion of a witnessed satisfactory test.
- Give notice when Works which are to be covered or concealed are ready for examination and/or measurement, not less than 10 working days
- Give notice to
- CA.

170.000 STATUTORY AUTHORITIES:
- Liaise with the Statutory Authorities and provide any test notices required to ensure final connections are made in accordance with the requirements of the testing and commissioning programme.

180.000 TEST NOTICES:
- Provide all formalities in connection with Test Notices, Agreement and Application for Supply Forms etc. Ensure all documents requiring the Employer's signature are forwarded to the CA in time to meet the building programme in order for the necessary test and supply arrangements to be made. No additional payments will be made for expenses incurred due to reconnections, re-visits etc., by Supply Authorities or any other officials.

190.000 PHOTOGRAPHS:
- Provide progress photographs of the Subcontract Works
- in colour.
- Format (.jpg)
- Size 1800 x 1500 pixels

A33 QUALITY STANDARDS / CONTROL

110.000 MAIN CONTRACT PRELIMINARIES:
- Quality Standards/control
- Applies to the whole of the Works, including this Subcontract. Comply with the requirements stated therein insofar as they relate or apply to the Subcontract Works, and co-operate with and assist the Main Contractor in complying with them generally.

120.000 DELEGATION:
- The CA may delegate certain powers and duties. The CA will indicate the duties and powers of the following:
  - Clerk of Works
  - Resident Engineer (Structural)
  - (Services) Engineering Site Staff

130.000 SUBCONTRACTOR'S PERSON-IN-CHARGE:
- Appoint a foreman-in-charge and/or site agent to ensure constant management and supervision of the Subcontract Works.
- Give maximum possible notice to the Contractor and CA before changing the foreman-in-charge or site agent.

140.000 DIMENSIONS:
- Where installations are dependent upon site dimensions ensure that these are available before proceeding with the Works.
- Do not take dimensions by scaling from the drawings.
- Where dimensions are indicated on drawings check these on-site, as appropriate, to ensure building construction and manufacturing tolerances can be accommodated.
- Do not order or manufacture equipment using dimensions indicated on the tender drawings, specification or schedules.

145.000 ASSESSMENT AND MONITORING:
- Record progress of the Works weekly on a copy of the programme kept on site. Update or redraft programme without delay if any circumstances arise which affect the progress of the Works.
- Mark up "As Installed" details weekly and before any work is hidden from view.

150.000 SETTING OUT FOR THE SUBCONTRACT WORK:
- Where this is done by the Main Contractor check its accuracy and obtain his approval before proceeding with the work.

160.000 SITE MODIFICATIONS:
- Do not make site modifications to assemblies without authorisation.
- Where site modifications to assemblies are authorised, make in accordance with manufacturer's certified drawings and instructions.
- Ensure that modifications made comply with any type test certificate obtained for arrangement of components.

170.000 STANDARDS, REGULATIONS AND BREEAM REQUIREMENTS:
- Provide all materials and works in accordance with the appropriate British Standard or Code of Practice and where no BS or CP is applicable the Agrement Certificate (in accordance with The British Board of Agrement (BBA)) for the particular item.
- Comply with all statutory instruments and regulations, and local byelaws relating to the area of the site current at
- The date of tender.
- Comply with the requirements of the Local Authority Building Inspector.
  - Comply with all relevant requirements included in the Main Contract Preliminaries Section
- Notify all authorities in accordance with their regulations and obtain any required approvals for the installation.
- Where no specific design, performance or installation standards are quoted the following

shall apply

- CIBSE Guide Books A, B and C.
- CIBSE Commissioning Codes.
- CIBSE Code for Lighting.
- CIBSE Technical Reports.
- CIBSE Technical Memoranda.
- Charted Institute of Plumbing and Heating Engineering, Plumbing Engineering Services Design Guide.

- Ensure all equipment and systems are designed and installed in accordance with the relevant standards and that operational compatibility exists between the systems and any other system installed at the same location.
- Supply plant and equipment to achieve the specified design conditions and to provide stable control.
- For insulation - comply with online guide to check long term impact of material selection - www.thegreenguide.org.uk

171.000 STANDARDS AND REGULATIONS:

- Provide all materials and works in accordance with the appropriate British Standard or Code of Practice and where no BS or CP is applicable the Agreement Certificate for the particular item.
- Provide products in accordance with the Construction Products Regulations (CPR). Products covered by harmonised European product standards (hENs) must have a Declaration of Performance (DoP) certificate for the product and be CE marked. Manufacturers of products not fully covered by a hEN or which do not fall within the scope of a hEN shall provide Declaration of Performance documentation in accordance with one of the methods in the CPR.
- Comply with all statutory instruments and regulations, relating to the area of the site current at
  - The date of tender.
- Comply with all Statutory Obligations arising from current legislation and regulations, together with other requirements, including, but not limited to, the following as applicable to particular projects:
  - Comply with the requirements of the Local Authority Building Inspector.
  - Statutory Obligations
    - Health and Safety at Work etc. Act 1974
      - HSE L8 Legionnaires' Disease. The Control of Legionella Bacteria in Water Systems ACOP and all parts of HSG274 (for technical guidance).
      - HSE L5 Control of Substances Hazardous to Health. ACOP and guidance (sixth edition, 2013).
    - Management of Health & Safety at Work Regulations 1999
      - HSE L8 Legionnaires' Disease. The Control of Legionella Bacteria in Water Systems ACOP and all parts of HSE 274 (for technical guidance).
      - HSE L5 Control of Substances Hazardous to Health. ACOP and guidance (sixth edition, 2013).
    - Gas Safety (Installation and Use) Regulations 1998
      - HSE L56 Safety in the Installation and Use of Gas Systems and Appliances: Gas Safety (Installation and Use) Regulations 1998. Approved Code of Practice and guidance (fifth edition, 2018).
    - The Gas Appliances (Safety) Regulations 1995.
    - The Gas (Meters) Regulations 1983 as amended.
    - The Measuring Instruments (Gas Meters) Regulations 2006.
    - The Petroleum (Consolidation) Regulations 2014.
    - The Control of Pollution (Oil Storage) Regulations 2001.
    - The Pipelines Safety Regulations and amendments
      - HSE L82 Guide to the Pipelines Safety Regulations 1996.
    - Pressure Systems Safety Regulations 2000
      - HSE L122 Safety of Pressure Systems. Pressure Systems Safety Regulations 2000. ACOP and guidance (second edition, 2014).

- Pressure Equipment (Amendment) Regulations 2015 and The Pressure Equipment (Safety) Regulations 2016.
- The Confined Spaces Regulations 1997
  - HSE L101 Safe work in confined spaces. Confined Spaces Regulations. ACOP and guidance (third edition, 2014).
- Building Regulations and current amendments, and relevant Approved Documents in England and Wales.
- The Energy Performance of Buildings Regulations (England and Wales) Regulations and amendments.
- The Ecodesign for Energy-Related Products Regulations 2010 as amended.
- The Scheme Regulations 2011 and the Domestic Scheme Regulations 2014, both as amended.
- England and Wales - The Water Supply (Water Fittings) Regulations 1999 as amended, the Water Act 2014 and The Construction Products Regulations 2013.
- London Building Acts 1939 and/or Building (Inner London) Regulations 1987, both as amended.
- Public Health Acts.
- Electricity Acts.
  - The Electricity at Work Regulations 1989
    - HSE HSR25 The Electricity at Work Regulations 1989. Guidance on Regulations (third edition, 2015).
  - The Electricity Safety, Quality and Continuity Regulations 2002 and current amendments.
- Factories Act 1961 and current amendments.
- Clean Air Act 1993 and current amendments.
- The Environmental Protection Act 1990 and current amendments.
- The Control of Pollution Act 1974 and current amendments.
- Air Quality Standards Regulations 2010.
- The Fluorinated Greenhouse Gases Regulations 2015.
- The Workplace (Health, Safety and Welfare) Regulations 1992
  - HSE L24 Workplace health, safety and welfare. ACOP and guidance (second edition, 2013).
- The Construction (Design and Management) Regulations 2015.
- The Health and Safety (Display Screen Equipment) Regulations 1992 as amended
  - HSE L26 Work with display screen equipment. Health and Safety (Display Screen Equipment) Regulations 1992 as amended (Miscellaneous Amendments) Regulations 2002. Guidance on Regulations (second edition, 2003).
- The Clean Air (Arrestment Plant) (Exemption) Regulations 1969 (Wales only).
- The Control of Substances Hazardous to Health (COSHH) Regulations 2002, as amended
  - HSE L5 Control of Substances Hazardous to Health. ACOP and guidance (sixth edition, 2013).
  - HSE L8 Legionnaires' Disease. The Control of Legionella Bacteria in Water Systems ACOP and all parts of HSG274 (for technical guidance).
- Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002
  - HSE L138 Dangerous substances and explosive atmospheres. Dangerous Substances and Explosive Atmospheres Regulations 2002. ACOP and guidance (second edition, 2013).
- The Control of Major Accident Hazards Regulations 2015 (COMAH).
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016.
- The CLP (Certification, Labelling and Packaging of Substances and Mixtures) Regulations 2015.
- Control of Asbestos Regulations 2012
  - HSE L143 Managing and working with asbestos. Control of Asbestos Regulations 2012. ACOP and guidance (second edition, 2013).
- The Provision and Use of Work Equipment Regulations 1998 (PUWER).
  - HSE L22 Safe use of work equipment. Provision and Use of Work Equipment

Regulations 1998. ACOP and guidance (fourth edition, 2014).
- Personal Protective Equipment at Work Regulations 1992
  - HSE L25 Personal protective equipment at work. Personal Protective Equipment at Work Regulations 1992. Guidance on Regulations (third edition, 2015).
- The Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)
  - HSE L113 Safe use of lifting equipment. Lifting Operations and Lifting Equipment Regulations 1998. ACOP and guidance (second edition, 2014).
- The Equality Act 2010 and current amendments.
- BS 8300-1 and BS 8300-2
- The Control of Electromagnetic Fields at Work Regulations 2016.
- The Electromagnetic Compatibility Regulations 2016.
- The Radio and Telecommunications Terminal Equipment Regulations 2000 as amended.
- The Medical Devices Regulations 2002 as amended.
- The Supply of Machinery (Safety) Regulations 2008 as amended.
- Public Utility Company and/or Statutory Authority regulations, specifications, and requirements.

- Other Requirements
  - British Standards and Codes of Practice.
  - BS 7671 - Requirements for Electrical Installations (IET Wiring Regulations).
  - BS EN 50110 series - Operation of Electrical Installations.
  - Insurance Company Requirements.
  - IEC Standards.
  - This specification is based on UK and European Standards, to achieve an approach for safety and compatibility for electrical, data network and information technology installations, and equipment, aligning with the European Committee for Electrotechnical Standardisation (CENELEC) approach.
    - Identify any instances where the proposed solution does not conform to the above.

- Notify all authorities in accordance with their regulations and obtain any required approvals for the installation.
- Where no specific design, performance or installation standards are quoted the following shall apply.
  - CIBSE Guides
    - Guide A Environmental Design
    - Guide B Heating, Ventilating, Air Conditioning and Refrigeration
    - Guide C Reference Data
  - CIBSE the SLL Code for Lighting.
  - CIBSE Technical Memoranda.
  - Charted Institute of Plumbing and Heating Engineering, Plumbing Engineering Services Design Guide.
- Ensure all equipment and systems are designed and installed in accordance with the relevant standards and that operational compatibility exists between the systems and any other system installed at the same location.
- Supply plant and equipment to achieve the specified design conditions and to provide stable control.
- For insulation: comply with online guide to check long term impact of material selection - www.thegreenguide.org.uk

180.000 TYPE TESTS:
- Provide certificates of verification of type tests. Ensure that drawings and other documents forming part of the certificate are available prior to any order being placed.

190.000 TEST CERTIFICATES:
- Where testing specific to the project is required, ensure test certificates include
  - Project title.
  - Details and date of test.
  - Instruments used, serial numbers, calibration dates.
  - Signature of those witnessing test.

- Contractor's name.
- Specific location of the item in the Works.

200.000 INSPECTION AND TESTS - ON OR OFF-SITE:

- Submit schedules showing those parts of the Works for which inspections and tests are required in the specifications, to substantiate conformity with the Specification and for which records are required to be maintained.
- Should any alternative item be proposed which does not carry appropriate certification, ensure independent testing is carried out at no expense to the Employer to confirm compliance.
- Where required, provide formal method statements supported by risk assessments detailing the procedures for carrying-out on-site tests. Agree in advance with all parties procedures for inspections and tests including periods of notice.
- Where a test indicates non-compliance with the Specification submit immediately details of the non-compliance and proposals for corrective action.
- Arrange access for personnel who require being in attendance, to manufacturer's or other off site premises when any inspections and tests carried out.
- Attendance or otherwise of the supervisory personnel during specified inspections or tests will not reduce the obligations or restrictions of the Contract.
- Carry out all tests required by legislation under the direction of a competent person.

210.000 INSPECTIONS AND TEST RECORDS:

- Prepare a set of drawings and/or report sheets to record accurately the test and inspection information including the following:
  - Plant identification, section and installation under test.
  - Manufacturer's reference number.
  - Date, time, duration of test, weather conditions.
- Test results with itemised readings including records of all other checks and tests.
- Maintain records of all specified inspections and tests performed including third party and works test certificates.
- Include in records, as appropriate, details of the element, item, batch or lot, the nature, number and date of the inspections and tests, the number and type of deficiencies found, any corrective action taken and other relevant particulars.
- Maintain all records on-site for inspection. On completion of the Works, include copies in the operating and maintenance manuals.
- Submit copies of records within one week of request.

220.000 TESTING AND COMMISSIONING OF SERVICES:

- Agree with the Contractor a programme for pre-commissioning checks, setting to work, commissioning and performance testing, and allow for all costs incurred.
- Where required, provide formal method statements supported by risk assessments detailing all commissioning procedures.
- Give notice to the Contractor and CA and state any requirements for the attendance and co-operation of others.
- Not less than 14 working days.
- Provide all necessary facilities to enable tests to be witnessed and inspections carried out either on-site or at manufacturer's works.
- The CA will only witness test proceedings, confirm recorded results and determine if the specified requirements have been satisfied.
- If following test or inspection, any plant or part thereof is shown to be defective or not conforming to the specification, the CA will reject such defective parts by written notice, within reasonable time, indicating area of dispute.
- Appoint an "approved engineer" to supervise the whole of the testing, commissioning, performance testing and instruction of client's staff.
- Provide all specialised personnel (including manufacturer's representatives) and co-ordinate their activities.
- Test all equipment, material and systems as detailed in sections. If an inspection or test fails, repeat the procedure, until satisfactory results are obtained.

- Complete all tests before any paint, cladding or similar materials are applied or before services are concealed.
- Ensure all requirements such as cleanliness, protection from harmful external and internal elements etc. are provided prior to commencement of commissioning.
- Following satisfactory completion of testing and when the installations are in a safe and satisfactory condition, set to work, regulate and adjust, as necessary, to meet the specified design requirements.
- Provide all necessary instruments and recorders to monitor systems during commissioning and performance testing.
- Provide test equipment subject to a quality assurance procedure complying with BS EN ISO 10012.
- Do not start performance testing, including system demonstration, system proving or environmental and capacity testing, until commissioning of the system is completed to the satisfaction of the CA.
- Maintain on-site full records of all commissioning and performance testing, cross referenced to system components and on completion of the Works include a copy in each Operating and Maintenance Manual.
- Provide all certification documents for approval by the CA before any system is offered for final acceptance.
  - Commissioning of building services as required by ADL2 (Section 5.16 - 5.28).
  - Gas, fuel oil, electricity and water for testing and commissioning will be provided and cost borne by **The Sub Contractor**.

230.000 COMMISSIONING PROCEDURES:
- Observe the following requirements when commissioning the Engineering Services.
- Progressive static testing will be witnessed by the CA when work is presented for testing. This will include:
  - Insulation resistance tests.
  - Earth fault loop impedance tests.
  - Earth continuity tests.
  - Pipeline pressure tests.
  - Air Ductline Pressure Tests.
- Finalise commissioning, taking into account site progress and availability of related services, with CA and Contractor, and agree access required for controls, etc.
- Completion for operational purposes implies the bulk of snagging has been offered to the CA and that remedial work has been completed. All fans, pumps etc. tested for operation, polarity, phase sequence and impedance etc.
- Pre-commissioning examination and testing to ensure that each system or item of equipment is complete, in a safe condition and all notices are displayed.

240.000 OPERATIONAL DEMONSTRATION:
- Provide a written statement to the CA confirming that each installation has been correctly tested and commissioned and that the performance requirements can be achieved.
- Demonstrate to the CA that all system components are operating correctly, and the completely integrated installation will function in accordance with the specified performance requirements.
- Carry out performance testing in both summer and winter conditions.
- Provide equipment to simulate loads to allow for the full testing of the air conditioning system(s) for the following areas: Sever Room

250.000 OUTSTANDING ACCEPTANCE TESTS:
- Any items which have failed their acceptance tests or where such tests are delayed by the client are to be listed and dates agreed, during the defects liability period when reasonable demands for consumer requirements are available.

260.000 SYSTEMS USED BEFORE PRACTICAL COMPLETION:
- Systems may not, without the prior written approval of the CA be used before Practical Completion. Systems to be used before practical completion for the benefit of the Contractor and/or Subcontractor must have all defective consumable elements (including lamps and

tubes) replaced by new not more than seven days prior to Practical Completion.

- No system shall be put into use prior to handover to the employer, except for testing and commissioning, unless in accordance with the following procedure:
  - Following the receipt of written instructions, the Subcontractor shall operate designated parts of the Subcontract Works, provided that such operation is practicable and does not prejudice the Subcontractor's responsibilities and obligations under the Subcontract.
  - Additionally and with adjustment to the Subcontract sum, the Subcontractor, shall if instructed, provide:
    - Comprehensive insurance including indirect loss for any plant being operated
    - Maintenance of the installation
    - Re-instatement of the installation to as new condition prior to handover to the Employer
    - Allow the defects liability period to commence on handover.

300.000 OPERATION OF SYSTEMS BEFORE THE PRODUCTION OF DRAWINGS AND/OR OPERATING AND MAINTENANCE MANUALS:

- Provide attendance, at no expense to the Employer, to put into service, operate 24 hours a day and maintain the systems to the Employer's requirements, including the provision of suitable competent labour, in the event that the Record Drawings and/or Maintenance Manuals are not available when the Works would, in the opinion of the CA, otherwise qualify for Practical Completion.
- In the event of the Subcontractor failing to provide this service satisfactorily the Employer shall be entitled to make his own arrangements and recover the full cost through the Contract.

BS APPENDIX

BS 7671:2018
Requirements for electrical installations. IET Wiring Regulations

BS 8300-1:2018
Design of an accessible and inclusive built envirmonment. External environment. Code of practice

BS 8300-2:2018
Design of an accessible and inclusive built environment. Buildings. Code of practice

BS EN 50110-1:2013
Operation of electrical installations. Part 1 General requirements

BS EN 50110-2:2010
Operation of electrical installations. Part 2 National annexes

BS EN ISO 10012:2003
Measurement management systems. Requirements for measurement processes and measuring equipment

A34 SECURITY / SAFETY / PROTECTION

110.000 MAIN CONTRACT PRELIMINARIES:

- Security/safety/protection

- Applies to the whole of the Works, including this Subcontract. Comply with the requirements stated therein insofar as they relate or apply to the Subcontract Works, and co-operate with and assist the Main Contractor in complying with them generally.

115.000 CDM REGULATIONS:

- Comply with the requirements of the CDM Regulations by
  - adhering to the rules of the Pre-Construction Information and Construction Phase Plan.
  - reporting accidents, injuries or dangerous occurrences to the main contractor.
  - providing the main contractor with appropriate input to the health and safety plan, including risk assessments, and to the health and safety file.
- providing the main contractor with information on the subcontract works which might affect the health or safety of any person.

120.000 DELIVERY:

- Provide an adequate and safe protection for all materials and products during transport to site.
- Deliver all tubes, conduit, trunking and associated equipment with open ends effectively plugged, capped or sealed.
- Deliver all ductwork, tubes, conduit, trunking and associated equipment with open ends effectively plugged, capped or sealed.

130.000 HANDLING:

- Offload and transport about the Works all materials and products as recommended by manufacturers.

140.000 STORAGE:

- Store all materials and products as recommended by manufacturers.
- Provide sufficient, safe and secure storage for all materials and products.
- Provide racks to prevent distortion for storage of conduits, pipes and similar materials.
- Store all fittings, accessories and sundry items in clean bins or bagged and stowed in racks and maintained under suitable weatherproof cover.

151.000 PROTECTION OF SUBCONTRACT WORKS:

- Provide adequate and safe protection for all materials and products after installation.
- Ensure all items are protected against ingress of water and dust, formation of condensation, extremes and rapid changes of temperature, building works and operations of others.
- Protect during erection all easily damaged materials with hardboard covers or heavy duty polythene sheet. Such items include but are not limited to
  - control panels,
  - switchboards,
  - distribution boards,
  - heater batteries,
  - finned pipework,
  - gauge glasses,
- Protect all finished items from damage and paint splashes.
- Install items such as grilles, diffusers, lighting fittings, switches, accessories etc. as near to completion as practicable.
- Only install filter media when the plant items concerned are being commissioned and tested.
- Cover all plant items with polythene sheeting except when being worked upon.
- Cap all open ends of pipes, ducts, conduit and trunking etc except when being worked upon.
- Leave plant and equipment in a ready to paint condition where specified as part of the Works or to be carried out by others.
- Paint parts liable to corrosion immediately after removal of any temporary protection.

- Replace material, plant or equipment where deterioration or damage has occurred prior to handover.

160.000 IDENTIFICATION:
- Where appropriate, ensure that materials, plant and equipment bear the brand name, serial/batch number and any other data required to identify their nature in relation to the Works.

170.000 ROTATING PLANT:
- Immediately prior to Practical Completion adjust, ease and lubricate moving parts as necessary to ensure easy and efficient operation.
- Ensure that, whenever necessary, temporary supplies are provided to enable motive plant items delivered and/or installed to be run at regular intervals to avoid damage or deterioration.
- Ensure that rotating plant is hand-turned periodically if temporary supplies are not available.

A35 SPECIFIC LIMITATIONS ON METHOD / SEQUENCE / TIMING

110.000 MAIN CONTRACT PRELIMINARIES:

- Specific limitations on method/sequence/timing are contained within the Main Contract Preliminaries
- Applies to the whole of the Works, including this Subcontract. Work within the limitations stated therein insofar as they relate or apply to the Subcontract Works, and co-operate with and assist the Main Contractor in working within them generally.

130.000 ORDERING OF MATERIALS AND PRODUCTS:

- Ensure that procurement details of materials are incorporated in the Subcontract programme.
- Avoid delays by submitting details of alternative manufacturers or types of materials/products to the CA in time to comply with the agreed programme of the Works.
- Order all materials/products necessary for the completion of the Works immediately after receipt of comments received and/or instructions to proceed. No delay to practical completion, or completion of any part thereof caused by delays in ordering will be accepted.

A36 FACILITIES / TEMPORARY WORK / SERVICES

110.000 MAIN CONTRACT PRELIMINARIES:

- Facilities/temporary work/services contained within the Main Contract Preliminaries applies to the whole of the Works, including this Subcontract.

A37 OPERATION / MAINTENANCE OF THE FINISHED BUILDING

101.000 SUBMISSION OF RECORD DOCUMENTS:

- To satisfy the provisions of the Health and Safety at Work Act the Employer will not accept handover of the installations until full and adequate information concerning the installations is in the possession of his operating and maintenance staff.
- Provide Record Documents - being part of the Works - prior, and as a prerequisite, to Practical Completion to the satisfaction of the CA.
- Prepare manuals in draft as the Works progress and make suitable arrangements where the Works are subject to Partial Possession or Sectional Completion.
- Submit draft Record Documents to the CA for comment prior to commissioning.
- Prepare two temporary Manuals with provisional record drawings and preliminary performance data available at commencement of commissioning to enable Employer's staff to familiarise themselves with the installation. These should be of the same format as the final Manuals with temporary insertions for items which cannot be finalized until the installations are commissioned and performance tested.
- Provide the CA with copies of the final Manual 4 weeks prior to Practical Completion

102.000 SUBMISSION OF DOCUMENTS FOR HEALTH AND SAFETY FILE:

- To satisfy the provisions of the Health and Safety at Work Act the Employer will not accept handover of the installations until full and adequate information concerning the installations is in the possession of his operating and maintenance staff.
- Provide Record Documents - being part of the Works - prior, and as a prerequisite, to Practical Completion to the satisfaction of the CA.
- Prepare manuals in draft as the Works progress and make suitable arrangements where the Works are subject to Partial Possession or Sectional Completion.
- Submit draft Record Documents to the CA for comment prior to commissioning.
- Prepare two temporary Manuals with provisional record drawings and preliminary performance data available at commencement of commissioning to enable Employer's staff to familiarise themselves with the installation. These should be of the same format as the final Manuals with temporary insertions for items which cannot be finalised until the installations are commissioned and performance tested.
- Provide the CA with copies of the final Manual 4 weeks prior to Practical Completion
- Prepare electrical record drawings in accordance with BS EN 61082-1.
- Prepare Operating and Maintenance Manuals for heating systems requiring a trained operator in accordance with BS EN 12170.
- Prepare Operating and Maintenance Manuals for heating systems not requiring a trained operator in accordance with BS EN 12171.

110.000 RECORD DOCUMENTS:

- Provide operating and maintenance manuals, system records and full documentation in accordance with the following standards as appropriate
  - Standard
    - BS EN 50131-1 - Intruder alarm systems.
    - BS 5839 - Fire detection and alarms in buildings.
    - BS 6701 - Telecommunications equipment and telecommunications cabling.
    - BS EN 62305 - Protection against lightning.
    - BS 7671 - Requirements for electrical installations (IET Wiring Regulations).
    - BSRIA BG 1/2007 - Handover, O&M Manuals and project feedback.
    - BS EN 82079-1 - General structuring, content and presentation of instructions for use.
- Provide
  - Record Drawings and Schedules.
  - Plant room and switch room drawings, schedules and schematics.
  - Operating and Maintenance Manuals.
  - Blank maintenance logs.
  - Building Log book following guidance in CIBSE TM 31: Building Log Book Toolkit.
- Ensure record documents clearly record the arrangements of the various sections of the Works as actually installed and identify and locate all component parts.

- Ensure record documents make it possible to comprehend the extent and purpose of the Works and the method of operation thereof.
- Ensure record documents set out the extent to which maintenance and servicing is required and how, in detail, it should be executed.
- Ensure record documents provide sufficient, readily accessible and proper information to enable spares and replacements to be ordered.
- Correlate record documents so that the terminology and the references used are consistent with those used in the physical identification of the component parts of the installations.
- Demonstrate as required throughout the execution of the Works that complete and accurate records are being maintained and that the record documents are being progressively compiled as the work on-site proceeds.
- Ensure the building log book contains the information outlined in the section on Providing Information in the appropriate Approved Document for, Conservation of fuel and power.

120.000 RECORD DRAWINGS AND SCHEDULES:

- Prepare Record Drawings as defined in the latest version of BSRIA BG 6 and Schedules. Drawings to be a scale not less than 1:50 from the Installation Drawings maintained on-site as the Works progress. Endorse all such documents 'RECORD DRAWINGS'. Where agreed with the CA certain detailed information may be provided in schedule form. Prepare electrical drawings in accordance with BS EN 61082-1.
- Provide reduced scale copies for inclusion in the operating and maintenance manuals as detailed in clause A37/A3.8:150.000.
- Record Drawings and Schedules must include, but are not limited to:
  - Location, including level if buried, of Utility Service connections, including those provided by the appropriate Authority, indicating points of origin and termination, size and material of service, pressure and/or other relevant information.
  - Disposition and depth of all underground systems.
- Schematic drawings of each system indicating principal items of plant, equipment, zoning, means of isolation, etc. in sufficient detail to make it possible to comprehend the system operation and the inter-connections between various systems.
- Details of the principles of application of automatic controls and instrumentation.
- Diagrammatic dimensioned plans and sections of each system or service showing sizes and locations of all ancillaries, plant, equipment controls, test points, and means of isolation etc. including any items forming an integral part of the engineering systems provided by others (such as plenum ceilings, builders' work shafts, chimneys etc.).
- Identification of all terminals/cables etc. by size/type and duty/rating as recorded from the approved commissioning results.
- Detailed wiring drawings/diagrams/schedules for all systems, including controls, showing origin, route, cable/conduit size, type, number of conductors, length, termination size and identification, and measured conductor and earth continuity resistance of each circuit.
- Ensure routes indicate if cable/conduit is surface mounted, concealed in wall chase, in floor screed, cast in-situ, above false ceiling etc.
- Details of co-ordination of wiring and connections with cable core identification, notation of fire alarm, security, control and instrumentation and similar systems provided as part of the Works.
- Details to show inter-connections between the Works and equipment or systems provided by others to which wiring and connections are carried out as part of the Works.
- Location and identity of each room or space housing plant, machinery or apparatus.
- Dimensioned plans and sections at a scale of 1:20 of plant rooms, service subways, trenches, ducts and other congested areas where in the opinion of the CA smaller scale drawings cannot provide an adequate record. Indicate the location, identity, size and details of each piece of apparatus.
- Manufacturers' drawings of equipment indicating
  - general arrangement and assembly of component parts which may require servicing.
  - internal wiring diagrams together with sufficient physical arrangement details to locate and identify component parts.
  - Schedules as required to locate, reference and provide details of ratings and duty of all items incorporated into the Works together with all fixed and variable equipment settings established during commissioning.

- For each programmable control item, schedules indicating for each input and output point connected, full data in respect of that point including reference, type of input/output, connected equipment reference, set values of temperature or pressure etc., set values of start/stop/speed change times, alarm priority, control specification reference and any other such parameters as are applicable.
- Each spare input and output point including reference, type of input/output and space for future entry of appropriate parameters as listed above.
- Logic flow diagrams for each individual control or monitoring specification and for each building services engineering system to illustrate the logical basis of the software design.
- Schedules setting out details of all initial values of user-defined variables, text statements for alarm messages etc.

130.000 PLANT ROOM AND SWITCH ROOM DRAWINGS, SCHEDULES AND SCHEMATICS:

- Provide good quality plant and switch room drawings, schedules and schematics.
- Hang the following in each plant room and switch room, any other appropriate location or where directed by the CA.
  - Schematic drawings of circuit layouts showing identification and duties of equipment, numbers and locations, controls and circuits.
  - Schedules in the form of printed sheets showing the number, type, location, application/service and symbol, and normal operating position of each means of isolation.
  - Control schematics.
  - Location of all plant and equipment items including plans and elevations of main switchgear showing physical disposition of switches.
  - First aid instructions for treatment of persons after electrical shock.
  - All other items required under Statutory or other regulations.
  - Location of all incoming service isolating and metering facilities.
  - Emergency operating procedures and telephone numbers for emergency call out service applicable to any system or item of plant and equipment.
- Prepare electrical drawings in accordance with BS EN 61082-1.
- Protect surface of drawings by
  - pressure lamination
- Framing under glass or other rigid, transparent, cleanable and protective surface.

140.000 OPERATING AND MAINTENANCE MANUAL SPECIALIST:

- Employ a specialist to prepare manuals.

150.000 OPERATING AND MAINTENANCE MANUALS:

- Prepare the O&M manuals following the guidance, proformas and model specification for O&M manuals in BSRIA Guide BG 1/2007 Handover, O&M Manuals and Project Feedback.
- Arrange the O&M manuals in a logical hierarchical structure in line with BS EN 82079-1.
- The operating and maintenance manuals must include as a minimum:
  - A full description of each of the systems installed, written to ensure that the Employer's staff fully understand the scope and facilities provided.
  - A description of the mode of operation of all systems including services capacity and restrictions.
  - Diagrammatic drawings of each system indicating principal items of plant, equipment, valves etc.
  - Details of how to re-commission so that complex plant services within the building can be re-commissioned by an engineer without any historic knowledge of the systems.
  - A photo-reduction of all record drawings together with an index. Reduced size
  - Legend of all colour-coded services.
  - Schedules (system by system) of plant, equipment, valves, etc. stating their locations, duties and performance figures. Each item must have a unique number cross-referenced to the record and diagrammatic drawings and schedules.
  - The name, address and telephone number of the manufacturer of every item of plant and equipment together with catalogue list numbers.
  - Manufacturer's technical literature for all items of plant and equipment, assembled

specifically for the project, excluding irrelevant matter and including detailed drawings, electrical circuit details and operating and maintenance instructions.

- A copy of all Test Certificates, Inspection and Test Records, Commissioning and Performance Test Records (including, but not limited to, electrical circuit tests, water service sampling / disinfection results, corrosion tests, type tests, start and commissioning tests) for the installations and plant, equipment, valves, etc. used in the installations.
- A copy of all manufacturers' guarantees or warranties, together with maintenance agreements offered by subcontractors and manufacturers.
- Copies of Insurance & Inspecting Authority Certificates and Reports.
- Starting up, operating and shutting down instructions for all equipment and systems installed.
- Control sequences for all systems installed.
- Schedules of all fixed and variable equipment settings established during commissioning.
- Procedures for seasonal change-overs and/or precautions necessary for the care of apparatus subject to seasonal disuse.
- Detailed recommendations for the preventative maintenance frequency and procedures which should be adopted by the Employer to ensure the most efficient operation of the systems.
- Details of lubrication systems and lubrication schedules for all lubricated items.
- Details of regular tests to be carried out (e.g. water cooling towers etc.)
- Details of procedures to maintain plant in safe working conditions.
- Details of the disposal requirements for all items in the works.
- A list of normal consumable items.
- A list of recommended spares to be kept in stock by the Employer, being those items subject to wear or deterioration and which may involve the Employer in extended deliveries when replacements are required at some future date.
- A list of any special tools needed for maintenance cross referenced to the particular item for which required.
- Procedures for fault finding.
- Emergency procedures, including telephone numbers for emergency services.
- Hospital Operational Policy.
- Back-up copies of any system software.
- Documentation of the procedures for updating and/or modifying software operating systems and control programmes.
- Instructions for the creation of control procedure routines and graphic diagrams.
- Details of the software revision for all programmes provided.
- Two back-up copies of all software items, as commissioned.
- Copies of relevant HSE/CIBSE/IET Guidance notes etc.
- Contractual and legal information including but not limited to details of local and public authority consents; details of design team, consultants, installation contractors and associated subcontractors; start date for installation, date of practical completion and expiry date for the defects liability period; details of warranties for plant and systems including expiry dates, addresses and telephone numbers.

152.000 BMS OPERATION AND MAINTENANCE MANUALS:

- Confirm that an initial draft of the O&M manual has been submitted for approval prior to commissioning. Ensure that the O&M documentation is produced as the work proceeds and is updated when necessary. Ensure that this work commences at the start of the contract and is added to/updated as the contract progresses. Confirm that approved final copies of the O&M manuals are provided at handover. Ensure that the O&M manual is properly indexed. Ensure that terminology and references are consistent with the physical identification of component parts.
- Confirm that the O&M manual includes the following and is included in the site health and safety file:
  - A written description of plant operation.
  - Control strategy/logic diagrams recording the final version of configuration software installed at handover.
  - Details of system application software configuration.

- A points list including hard and soft-points (all points should have a unique mnemonic)
- A description of user adjustable points.
- Commissioning record details.
- Detailed data sheets for all control components and equipment.
- Wiring circuit details including origin, route and destination of each cable.
- Basic security access to the system.
- Comprehensive instructions for switching on, operation, switching off, isolation, fault finding and procedures for dealing with emergency conditions.
- Instructions for any precautionary measures necessary.
- Instructions for the routine operation of the control system including simple day-to-day guidance for those operating the control system with limited technical skill.
- Instructions for servicing and system upkeep.
- A provision for update and modification.

- Confirm that the O&M manual includes comprehensive system operating instructions.

155.000 EPC AND DEC REQUIREMENTS:

- An EPC is required on selling or letting of a building, except for the following types of building
  - Places of worship.
  - Temporary buildings with a planned use of less than two years.
  - Stand-alone buildings with a total useful floor area of less than 50m^2 that are not dwellings.
  - Industrial sites, workshops and non-residential agricultural buildings with low energy demand.
  - Buildings due to be demolished.
- A DEC and advisory report are required for buildings with a total useful floor area over 1000m^2 that are occupied in whole or part by public authorities and by institutions providing public services to a large number of persons and therefore frequently visited by those persons.

160.000 PRESENTATION OF THE OPERATING AND MAINTENANCE MANUALS:

- Agree format and contents with the CA.
- Encase the Manuals in A4 size, plastic-covered, loose leaf, four ring binders with hard covers, each indexed, divided and appropriately cover- titled. Fold drawings larger than A4 and include in the binder so that they may be unfolded without being detached from the rings.
  - Dividers between sections to use stepped, overlapping printed card.
  - Paper weight to be at least 100gsm.
- Electronic format stored on CD.

170.000 RECOMMENDED SPARE PARTS:

- Before practical completion submit to the CA a schedule of spare parts as called for in individual sections and any others that the Subcontractor recommends should be obtained and kept in stock by the Employer for maintenance of the services installations included in the Subcontract. Time scale
  - Weeks before - 4 weeks
- State against each item the manufacturer's current price, including packaging and delivery to site. Identify those items which are additional to those specified for inclusion in individual Sections.

171.000 INITIAL SUPPLY OF ADDITIONAL SPARE PARTS:

- Submit to the CA a quotation, priced in detail, for the initial supply to the Employer of the additional spare parts identified under clause A37/A3.8:170.000, and including for:
  - Checking that each spare part is suitable for the replacement of the corresponding part supplied with the item of plant or equipment.
  - Checking receipt, marking and numbering in accordance with the schedule of spare parts.
  - Referencing to the plant and equipment list in the Operation and Maintenance Manual.
  - Painting, greasing, etc. and packing to prevent deterioration during storage.
- Time scale

- Within number of weeks of request - 4 weeks

180.000 RECOMMENDED TOOLS:

- Before practical completion submit to the CA a schedule of tools and portable instruments as called for in individual Sections and any others that the Subcontractor recommends should be obtained and kept in stock by the Employer for maintenance of the services installations included in the Subcontract. Time scale
  - Weeks before - 4 weeks
- State against each item the manufacturer's current price, including packaging and delivery to site. Identify those items which are additional to those specified for inclusion in individual Sections.

181.000 SUPPLY OF TOOLS:

- Provide all tools detailed within individual Sections.
  - Submit to the CA a quotation, priced in detail, for the initial supply to the Employer of the additional tools identified under clause A37/A3.8:180.000.
  - Include for the following.
    - Checking that each item is suitable for the intended application.
    - Checking receipt, marking and identifying.
    - Referencing, where appropriate, to the plant and equipment list in the Operation and Maintenance Manual.
    - Protecting, greasing, etc. and packing to prevent deterioration.
    - Providing a suitable means of storing and securing same.
- Time scale
  - Within number of weeks of request - 4 weeks

190.000 TRAINING OF EMPLOYER'S STAFF:

- Before practical completion explain and demonstrate the purpose, function and operation of the installations including all items and procedures listed in the Operation and Maintenance Manual:
  - to the operational staff.
- Provide training for the operation of the controls, monitoring or BMS installations for one or more of the following levels of operator.
  - Basic operator
    - Ensure that the operator is trained to:
      - Call up and view point-data from plant schematics and/or points lists.
      - Acknowledge system alarms.
      - View trend logs.
  - Intermediate operator
    - In addition to the requirements for a basic operator, ensure that the operator is trained to make basic alterations to the

BMS including changes to:

      - Time and occupancy programmes.
        - Control set-points.
        - Setting up trend logs.
        - Setting up alarm routines.
    - Ensure that the operator is also trained for testing and routine inspection of sensors and actuators.
  - Advanced operator
    - In addition to the requirements for an Intermediate operator, ensure that the operator is trained to:
      - Add or change graphics/schematics.
      - Change control strategies.
      - Add analogue and digital inputs/outputs to the system.
      - Back-up the system and archive logged data.
      - Re-load system software/configuration details.
      - Add/modify passwords/monitor system security.
  - Ensure that training is completed before the BMS is handed over.

- Ensure that each trained operator signs a training acceptance certificate(s).
- Provide appropriate reference and training manuals for the operator.

200.000 READING OF METERS:
- Record readings of all water, gas, and electricity meters immediately on completion of the Works and forward, via the Main Contractor, to the CA.

210.000 OBLIGATIONS DURING DEFECTS LIABILITY PERIOD:
- Prepare and submit records of failures or malfunctions of any part of the Subcontract Works during the Defects Liability Period, together with details of remedial action taken, subsequent re-testing and the results.
- Notify the Main Contractor of damage, failures or malfunctions to the Subcontract Works demonstrably caused by incorrect operation of the installations, vandalism or other actions by a third party.
- Inform the CA, via the Main Contractor, in writing when all defects are finally rectified so that an inspection may be carried out prior to the issue of a Final Certificate.

BS APPENDIX

BS 5839-1:2017
Fire detection and fire alarm systems for buildings. Part 1 Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises

BS 5839-3:1988
Fire detection and alarm systems for buildings. Part 3 Specification for automatic release mechanisms for certain fire protection equipment

BS 5839-6:2013
Fire detection and fire alarm systems for buildings. Part 6 Code of practice for the design, installation, commissioning and maintenance of fire detection and fire alarm systems in domestic premises

BS 5839-8:2013
Fire detection and fire alarm systems for buildings. Part 8 Code of practice for the design, installation, commissioning and maintenance of voice alarm systems

BS 5839-9:2011
Fire detection and fire alarm systems for buildings. Part 9 Code of practice for the design, installation, commissioning and maintenance of emergency voice communication systems

BS 6701:2016+A1:2017
Telecommunications equipment and telecommunications cabling. Specification for installation, operation and maintenance

BS 7671:2018
Requirements for electrical installations. IET Wiring Regulations

BS EN 12170:2002
Heating systems in buildings. Procedure for the preparation of documents for operation, maintenance and use. Heating systems requiring a trained operator

BS EN 12171:2002
Heating systems in buildings. Procedure for the preparation of documents for operation, maintenance and use. Heating systems not requiring a trained operator

BS EN 50131-1:2006+A2:2017
Alarm systems. Intrusion and hold-up systems. Part 1 System requirements

BS EN 61082-1:2015
Preparation of documents used in electrotechnology. Part 1 Rules

BS EN 62305-1:2011
Protection against lightning. Part 1 General principles

BS EN 62305-2:2012
Protection against lightning. Part 2 Risk management

BS EN 62305-3:2011
Protection against lightning. Part 3 Physical damage to structures and life hazard

BS EN 62305-4:2011
Protection against lightning. Part 4 Electrical and electronic systems within structures

BS EN 82079-1:2012
Preparation of instructions for use. Structuring, content and presentation. General principles and detailed requirements

A50 WORKS / PRODUCTS BY/ON BEHALF OF THE EMPLOYER

110.000 PRODUCTS:

- Products provided by or on behalf of the Employer.
- Details of such products are given in the relevant Sections, for fixing by the Subcontractor.
- Advise CA not less than
  - Two months before the date such products are required on-site. Advise of revised dates to suit any changes to the contract programme.
- Take delivery, check condition, mark receipts and take into appropriate storage. Advise the CA of details and number of items.
- Use for no other purpose than the Subcontract Works.
- Keep safe any surplus to requirements and obtain instructions in relation thereto.
- Once products provided by or on behalf of the Employer are in the possession of the Subcontractor all conditions of the Contract and technical specifications are applicable to such items, including all requirements for protection, storage, distribution, fixing, insurances, replacement if damaged/stolen/lost etc., painting, identification, setting to work and commissioning.

APPENDICES

APPENDIX A

DESIGN RESPONSIBILITIES

APPENDIX A – DESIGN RESPONSIBILITIES

This following has been produced based on BG6 proformas

RIBA Stage: 5 (Construction and Commissioning)

Item	Design Activity	Allocated To			Notes/Comments
		Designer	Contractor	Other	
General obligations, external liaison (statutory bodies, utilities)					
5.1.1	Notify the necessary statutory bodies (building control, fire officer, and environmental health) in respect of all tests and demonstrations required.		✓		
5.1.2	Carry out air tightness test of completed building envelope.				
5.1.3	Seek full statutory approval of the works and arrange all necessary attendance, and documentation.		✓		
5.1.4	Apply for G59 interfaces (for connection of onsite electricity generation to the grid).				
Client liaison (briefing, handover, surveys)					
5.2.1	Oversee the instruction of the client's staff (FM team and end-users as appropriate) in the use, operation and maintenance of the installations.		✓		
5.2.2	Prior to handover, instruct the client's staff (FM team and end-users as appropriate) in the use, operation and maintenance of the installations in advance of handover.		✓		
5.2.3	Examine and comment on the contents of the operating and maintenance information in order to ensure compliance with the specified requirements.		✓		
5.2.4	Modify and update operating details to reflect commissioning results.		✓		
5.2.5	Modify project information as the works progress, so that all alterations arising during installation are recorded.		✓		Models, drawings, schedules, etc.
5.2.6	Inspect draft record drawings at agreed intervals and comment on their content with respect to the size and positions of installed systems and plant.		✓		
5.2.7	Establish central and visible 'home base' for aftercare team as defined by Soft Landings.				
5.2.8	Arrange for all appropriate maintenance contracts to be in place for start immediately after handover.		✓		
5.2.9	Provide recommendations for the commencement and carrying out of operation and maintenance during and after the defects liability period.		✓		
Team liaison (builders' work, spatial coordination, energy targeting)					
5.3.1	Prepare accredited as-constructed energy consumption information for Building Regulations and (if relevant) the actual Energy Performance Certificate.		✓		
5.3.2	Update building services information models in response to changes made during construction, installation and commissioning.		✓		
Selection of plant and specialist designers					
5.4.1	Review Contractor Design Portion, trade contractor or specialist design information against the technical		✓		

	design.				
5.4.2	Incorporate changes arising from Contractor Design Portion, trade contractor or specialist design information in the technical design, and revise models, drawings and information as appropriate.		✓		
Mechanical design					
Electrical design					
Public health design					
Commissioning					
5.8.1	Comment on the adequacy of systems for commissioning as detailed on specialists' drawings and manufacturers' shop drawings prior to actual manufacture at works.		✓		
5.8.2	Attend commissioning meetings as necessary.		✓		
5.8.3	Arrange and chair commissioning meetings as necessary.		✓		
5.8.4	Monitor the progress of commissioning and testing of all software programming, systems and plant, including assessment of whether installations meet the original (or amended) design intent.		✓		
5.8.5	Conduct mock-up performance tests.		✓		
5.8.6	Conduct pre-commissioning works (verification of installation works and static tests).		✓		
5.8.7	Commission all systems to agreed method, logic and programme, and in accordance with the commissioning specification. Record the results.		✓		
5.8.8	Attend witness testing and commissioning of off-site manufactured assemblies at manufacturers' premises.		✓		Usually during manufacture
5.8.9	Demonstrate that the overall and complete systems perform correctly in the required manner and as intended by the specification.		✓		
5.8.10	Record all plant settings from commissioning.		✓		
5.8.11	Accept completed systems.		✓		
Deliverables – including drawings, specifications, reports					
5.9.1	Provide final installation details, including dimensions, of electrical switchgear to ensure that cable entry is acceptable in the selected location and that safe operating and maintenance clearances are provided.		✓		
5.9.2	Provide final installation details, including dimensions, of automatic control panels to suit the detailed requirements of the agreed supplier of the controls equipment.		✓		
5.9.3	Provide detailed BMS point schedules, wiring schematics, control panel labelling details and equipment schedules for the complete works.		✓		
5.9.4	Provide detailed electrical wiring diagrams of all equipment supplied showing all interconnections between equipment to enable all necessary wiring to be undertaken.		✓		
5.9.5	Provide installation model.		✓		
5.9.6	Provide installation drawings.		✓		
5.9.7	Provide builders' work details.		✓		

5.9.8	Provide shop and fabrication drawings.		✓		
5.9.9	Provide a final commissioning report detailing the results of the commissioning and commenting on the performance of systems signed by a competent person.		✓		
5.9.10	Provide schedule of activities/works required for handover.		✓		
5.9.11	Provide all necessary calculations, drawings, information and logs for the Health and Safety File.		✓		
5.9.12	Provide a schedule of all spare parts required for the works including recommendations of any others not stated in the specification.		✓		
5.9.13	Provide a schedule of all tools required for the works including recommendations of any others not stated in the specification.		✓		
5.9.14	Provide operating and maintenance manuals.		✓		Identify specialist author for production
5.9.15	Provide as-built model or final project information model (as per PAS 1192-2) incorporating all changes made during installation.				
5.9.16	Provide record drawings incorporating all changes made during installation.		✓		
5.9.17	Provide building manual(s) and/or building user guide(s) and/or building log book(s) in accordance with the requirements of the specification and the Building Regulations.		✓		Including system completion certificates and instructions on controls, energy saving and water saving features.
5.9.18	Provide planned preventative maintenance schedules.		✓		
5.9.19	Provide operation and maintenance information in accordance with the specified requirements.		✓		
5.9.20	Provide comments on draft record information and operating and maintenance manuals.		✓		
5.9.21	Provide technical guide for the facilities management team.		✓		
5.9.22	Provide recorded water, gas and electricity meter readings on completion of the works.		✓		
5.9.23	Provide pre-handover defects schedule.		✓		Usually these defects are expected to be rectified before handover
5.9.24	Provide site visit reports.	✓		✓	
5.9.25	Provide comments on proposals submitted by the building services contractors and/or trade-contractors.	✓		✓	
5.9.26	Sign off design and equipment changes proposed.	✓		✓	
5.9.27	Provide comments on programmes.			✓	
5.9.28	Provide as-installed information to the Environmental Assessment Method Assessor.		✓		
5.9.29	Provide report on agreed outcomes following participation in any Soft Landings process.				

Notes:

1. The absence of a design activity does not imply it is not required on the project.
2. Should any activity clash with other contractual information, inform the Employers Representative or Contract Administrator during the tender period.
3. The schedule shall be read in conjunction with the complete specification, schedules and drawings.

RIBA Stage: 6 (Handover and Close Out)

Item	Design Activity	Allocated To			Notes/Comments
		Designer	Contractor	Other	
General obligations, external liaison (statutory bodies, utilities)					
Client liaison (briefing, handover, surveys)					
6.2.1	Update as-built/project information models in response to changes made during handover.		✓		
6.2.2	Incorporate relevant information from project information model into asset information model (as per PAS 1192-2 and PAS 1192-3).				
6.2.3	On site attendance by aftercare team during first eight weeks of occupation.		✓		
6.2.4	Hold meetings/workshops with end-users/occupiers during the first eight weeks of occupation.		✓		
6.2.5	Hold regular meetings with user representatives during Year 1 of occupation.		✓		Specify frequency, e.g. every 3-4 months in Year 1
6.2.6	Review building performance against energy targets during Year 1 of occupation.		✓		Specify frequency, e.g. every 3 months
6.2.7	Hold end-of-year reviews of the general and environmental performance of the building.		✓		
6.2.8	Visit site to train and/or transfer information about the use of the building services to the facilities management team and the building occupiers.		✓		
Team liaison (builders' work, spatial coordination, energy targeting)					
6.3.1	Review project health and safety performance.		✓		
6.3.2	Organise lessons learned workshop for the project with design team, main contractor, significant specialist contractors and FM team.		✓		In this context, specialist contractors may mean the key contractors responsible for major work packages such as building services, controls, steelwork, partitions, etc.
Selection of plant and specialist designers					
Mechanical design					
Electrical design					
Public health design					
Commissioning					
6.8.1	Carry out seasonal commissioning from practical completion including environmental testing and monitoring.		✓		Define timetable
6.8.2	Attend seasonal commissioning activities carried out by others.		✓		
Deliverables – including drawings, specifications, reports					
6.9.1	Provide a reviewed and updated list of defects identified during post completion audit.		✓		
6.9.2	Provide COBie tables for BIM Level 2 Information Exchange 6.				
6.9.3	Provide written reviews of energy use and system performance (as defined in the Soft Landings framework).				
6.9.4	Provide outturn cost analysis.		✓		

6.9.5	Provide updated as-built/project information model incorporating defect rectification and any changes resulting from Year 1 aftercare.		✓		
6.9.6	Provide updated record drawings incorporating defect rectification and any changes resulting from Year 1 aftercare.		✓		
6.9.7	Provide lessons learned report.		✓		
6.9.8	Provide report on any defects reported during the liability period.		✓		
6.9.9	Provide comments on record information including operating and maintenance manuals.	✓		✓	
6.9.10	Provide report on agreed outcomes following participation in any Soft Landings process.				

Notes:

1. The absence of a design activity does not imply it is not required on the project.
2. Should any activity clash with other contractual information, inform the Employers Representative or Contract Administrator during the tender period.
3. The schedule shall be read in conjunction with the complete specification, schedules and drawings.

RIBA Stage: 7 (In Use)

Item	Design Activity	Allocated To			Notes/Comments
		Designer	Contractor	Other	
General obligations, external liaison (statutory bodies, utilities)					
Client liaison (briefing, handover, surveys)					
7.2.1	Carry out Post Occupancy Evaluation.		✓		Specify extent and tools to be used
7.2.2	Hold regular meetings with user representatives during Years 2 and 3 of occupation.				Specify frequency, e.g. every 6 months in Years 2 and 3
Team liaison (builders' work, spatial coordination, energy targeting)					
Selection of plant and specialist designers					
Mechanical design					
Electrical design					
Public health design					
Commissioning					
Deliverables – including drawings, specifications, reports					
7.9.1	Provide written reviews of energy use and system performance (as defined in the Soft Landings framework and against any in-use targets set for project).				Define frequency of reviews
7.9.2	Provide updated as-built/project information model incorporating any changes resulting from Years 2 and 3 aftercare and update asset information model as necessary.		✓		
7.9.3	Provide updated record drawings incorporating any changes resulting from Years 2 and 3 aftercare.		✓		
7.9.4	Agree other deliverables.				Identify and agree deliverables to be undertaken together with any timescales

Notes:

1. The absence of a design activity does not imply it is not required on the project.
2. Should any activity clash with other contractual information, inform the Employers Representative or Contract Administrator during the tender period.
3. The schedule shall be read in conjunction with the complete specification, schedules and drawings.